

REMARKS

Pursuant to the present amendment, claims 9-11 and 32-34 have been canceled. Thus, claims 1-8 and 12-31 are pending in the present application. Applicants confirm the election to prosecute claims 1-8 and 12-31. Of course, Applicants reserve the right to pursue the subject matter defined by claims 9-11 and 32-34 in a later filed application should they so desire.

Pursuant to the present amendment, claims 1-3, 13-14 and 26-28 have been amended. No new matter has been introduced by way of the present amendment. Reconsideration of the present application is respectfully requested.

In the Office Action, claims 1-8 and 12-31 were rejected under 35 U.S.C. § 112 as allegedly being indefinite. See Office Action, p. 3-4. Applicants respectfully traverse the Examiner's rejection.

By way of background, the present invention is directed to a polycrystalline diamond element that exhibits improved resistance to thermal degradation. As indicated in the background section of the application (§§ 0009-0012), prior art polycrystalline diamond elements may be subject to thermal degradation due to two distinct forms of failure. A first form of thermal degradation is due to differential thermal expansion between the catalyzing material and the diamond matrix that begins at temperatures of around 400°C. A second form of thermal degradation causes the diamonds to graphitize at temperatures of about 750°C.

To solve or at least reduce some of these problems, the application discloses a polycrystalline diamond element that has enhanced thermal properties that may eliminate or reduce the thermal degradation problems identified above while maintaining the toughness, convenience of manufacture, and bonding ability of traditional PDC elements (§ 0063). As indicated in the specification, with the catalyzing material 64 removed or depleted, the two major mechanisms for thermal degradation are no longer present. That is, removal of the catalyzing

material to a certain depth allows the bonding crystals 60 to conduct away the heat generated by a thermal event to a temperature below the degradation temperature of the diamond crystals when catalyzing material is present (§§ 0078-0081). The specification goes on to note that if a friction event at the working surface caused a sudden extreme heat input, the bonded diamond crystals of the PDC element conducts the heat away in all directions. Accordingly, the bonded diamond crystals exhibit a temperature gradient of 1000°C per millimeter or higher. As a result of these thermal characteristics, a 950°C temperature at the working surface does not cause significant thermal degradation if the interstices 62 and the surfaces of the diamond crystals 62 adjacent to the working surface are substantially free of the catalyzing material 64 to a depth of, for example, 0.2 mm from the source of the heat (§ 0084).

As the Examiner well knows, 35 U.S.C. § 112 requires that the claims, read in light of the specification, reasonably apprise those skilled in the art of the use and scope of the invention. *See, e.g., Shatterproof Glass Corp. v. Liberty-Owens Ford Co.*, 225 U.S.P.Q. 634, 641 (Fed. Cir.), *cert. dismissed*, 475 U.S. 976 (1985). Moreover, functional language does not, in and of itself, render a claim indefinite. *In re Swinehart*, 169 U.S.P.Q. 226, 229 (CCPA 1971). It is respectfully submitted that the pending claims set forth in the present response fully meet these requirements.

Pursuant to the present amendment, independent claims 1 and 26 have been amended in a manner believed to overcome the Examiner's indefiniteness rejection. More specifically, claims 1 and 26 have been amended to recite that the bonded diamonds exhibit a thermal characteristic such that a 950°C temperature at the working surface results in a temperature of less than 750°C at the depth (previously defined in the claims). It is respectfully submitted, under the legal principles set forth above, that claims 1 and 26, as amended, are not indefinite. More specifically, it is respectfully submitted that one skilled in the art, when reading the specification,

would readily understand that the polycrystalline diamond elements of the present invention are manufactured in such a manner and are of such a structure such that they exhibit desired thermal properties or characteristics to overcome or reduce the thermal degradation problems outlined in the background of the application. The specification is replete with examples describing how removing substantially all of the catalyzing material from portions of the bonded diamonds results in a structure that is able to rapidly dissipate heat applied to the working surface of the polycrystalline diamond element. Thus, the claims recite that the bonded diamond crystals exhibit a thermal characteristic such that a 950°C temperature at the working surface results in a temperature of less than 750°C at the previously specified depth in the claim.

In view of the foregoing, it is respectfully submitted that amended independent claims 1 and 26, and all claims depending therefrom, are not indefinite and fully comply with the requirements of 35 U.S.C. § 112.

Claims 2-3, 13-14 and 27-28 have been amended to provide an appropriate antecedent basis and/or to be consistent with the amendments set forth in their respective independent claims.

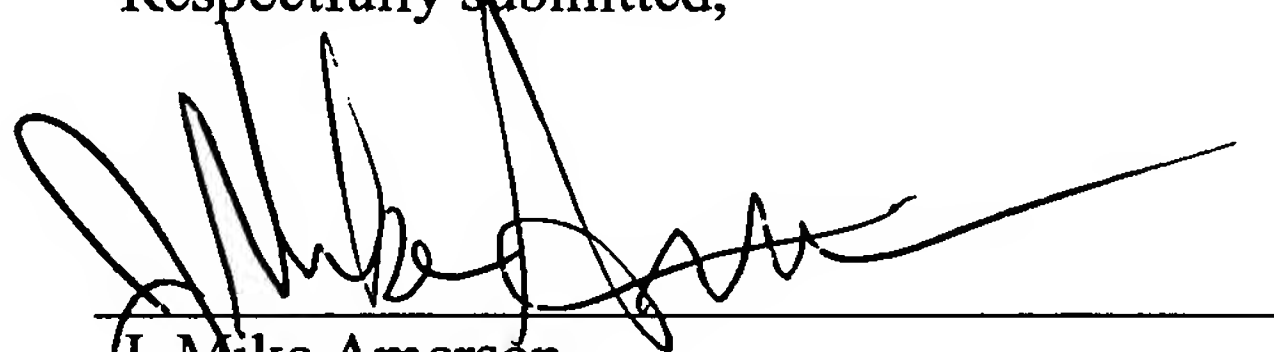
In the Office Action, the Examiner stated that claims 1 and 8 of the present application would appear to conflict with claims 6 and 7 of application No. Serial 10/604,007. Claim 6 of application Serial No. 10/604,007 further limits claim 1 by reciting that the body is bonded to a substrate of a less hard material, and claim 7 of application Serial No. 10/604,007 further limits claim 6 by requiring that the less hard material is cemented tungsten carbide. In contrast, the claims of the present application (Serial No. 10/604,210), specifically claims 1 and 8 identified by the Examiner, contain additional limitations not found in the claims of the pending application (Serial No. 10/604,007). More specifically, the claims in the present application (Serial No. 10/604,210) recite (claim 1) the polycrystalline diamond element comprises a

metallic substrate and that the body of bonded diamonds have a diamond density of at least 85% by volume. Such limitations are simply not present in claims 6 and 7 of application Serial No. 10/604,007. Thus, it is believed that the claims identified by the Examiner do not conflict with one another and that maintenance of all of the claims in the various applications is appropriate.

On August 11, 2004, the undersigned conferred with Examiner Turner regarding the present Office Action, specifically, the Examiner's § 112 rejection of the claims on the basis of indefiniteness. During that conversation, Examiner Turner also stated that she would require a Terminal Disclaimer be filed for this application (10/604,210) in view of co-pending application Serial No. 10/604,007. Submitted herewith is a Terminal Disclaimer as requested by the Examiner.

In view of the foregoing, it is respectfully submitted that all claims pending in the present application should be allowed. The Examiner is invited to contact the undersigned at (713) 934-4055 or Jeffery Daly at (832) 681-8623 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,



Date: August 13, 2004

J. Mike Amerson
Reg. No. 35,426
Williams, Morgan & Amerson, P.C.
10333 Richmond, Suite 1100
Houston, Texas 77042
(713) 934-4055
(713) 934-7011 (facsimile)

ATTORNEY FOR APPLICANTS